IOWA STATE UNIVERSITY

The Eighth Grade U.S. History Classroom in a 1:1 iPad Environment

Action Research Project CI 515

Michelle Cowell

Introduction

Tablets, and more specifically iPads, have quickly taken the world by storm. The iPad sold over a million devices in its first month on the market in 2010 (Goldman, 2010). In addition to the growing popularity of tablets, 1:1 programs are also quickly increasing in popularity. These programs represent a major investment for school districts and expectations for these programs seem just as major. As 1:1 laptop and tablet programs continue to increase in popularity, it is necessary to look at how these programs are implemented and how such programs meet educational goals in relation to planning, the teacher, the student, the device, and the concept of 1:1 itself.

This research project is focused on the use of the iPad in a 1:1 educational setting and how this tool is impacting students' learning behaviors as well as the preparation, pedagogy and expectations of the teachers in this setting. The observations for this study were done in an eighth grade U.S. History classroom during its first year in a 1:1 iPad program. Related literature shows a definite promise for 1:1 technology programs, but also shows that there are still improvements to be made in the implementation of these types of programs. The difficulty seems to be in determining the next right step.

For this project the Dialectic Action Research Spiral described by Mills (Mills, 2010), an illustrated below was chosen as the action research method. Through the use of this model, an area of focus was

determined, followed by data collected through classroom observations, a teacher survey, and electronic interviews of the teacher and students. The analysis and interpretation of the data are reported in this paper in the findings section. That is followed by an action plan for utilizing the data and steps to take to further improve the use of the 1:1 iPad as educational tool.

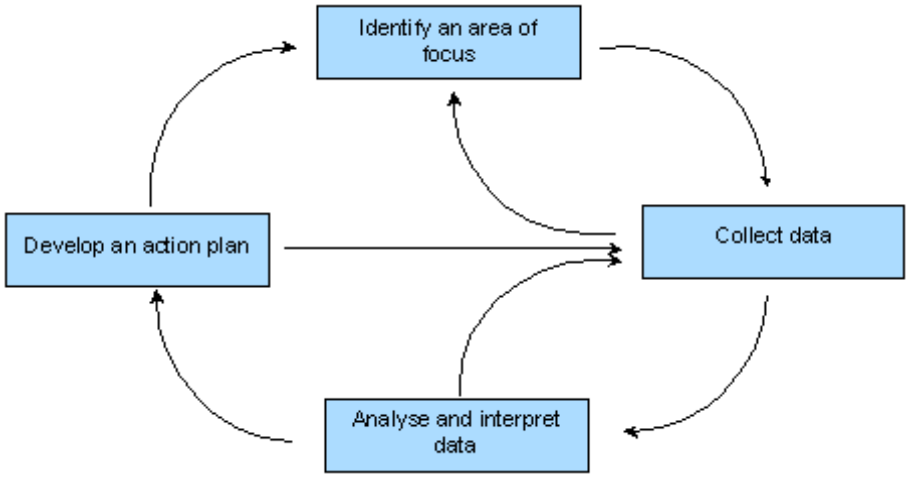

Figure 1. The Dialectic Action Research

The use of this action research model, allowed the researcher to choose an area of focus that was structured through the research questions. The determination of the research questions provided focus for the review of related literature. This literature review combined with the research questions determined the intervention, and membership and negotiations for the study. These sections of the paper are followed by the timeline, and the data collection, analysis and findings. Closing the paper is the action plan, references, and appendices.

Area of Focus

The purpose of this study is to describe the impact of the 1:1 iPad program on student learning in an 8th grade U.S. History classroom. To accomplish this, the researcher will determine if teachers have changed their pedagogy, and expectations during the first year of the 1:1 iPad program. The researcher will also determine if students have changed their learning behaviors due to the implementation of the 1:1 iPad program.

This is the first year in our 1:1 iPad program at the Middle School. This program was instituted solely to answer the issue of providing enough technology to successfully educate our students. The iPad was selected as the technology to put in the hands of students for two reasons. First, it addressed the issue of affordability and second, it allowed the district to meet the future needs of the students. I think the right decision was made when choosing the iPad, but there is a responsibility to make sure that there are changes to the way students are educated that best utilize the available tools to meet the students' needs. As with any educational program or innovation, it is essential to look at its effectiveness and that is the intended purpose of this study. To conduct this study, it was important to question the impact of the 1:1 iPad program not just on the students, but on the teachers as well.

Research Questions

Main Question

What impact does a 1:1 iPad program have on student learning in an eighth grade US History classroom?

Sub-questions

1. How has the teacher changed his pedagogy, preparation, and expectations while using the iPad with students in a 1:1 program?
2. How have students changed their learning behaviors while using the iPad in a 1:1 program?

Review of Related Literature

This literature review examines the implementation of 1:1 programs, the use of iPads in the educational setting and the use of TPACK (Technological Pedagogical, Content Knowledge) in teacher planning when implementing 1:1 programs. Since the iPad is such a new device, there is little research available evaluating the use of the iPad in the classroom. Thus, much of this literature review focuses on the general concept of 1:1 computing rather than 1:1 programs with iPads or other tablets. Because this study uses TPACK to evaluate teacher planning and preparation in the classroom, literature pertaining to the TPACK process is also reviewed.

Background: The iPad

The iPad was released in 2010 (Goldman, 2010) followed a year later by the iPad 2 which included a camera among the updated features (Apple, 2011). There is very little available literature that deals with using iPads in an educational setting. However, there are a couple of studies worth noting here that focused on mobile technologies such as the iPad. Banister (2010) studied the use of the iPod Touch in the classroom, while Murray and Olcese (2011) studied the educational potential of the first iPad.

The iPod Touch was the precursor to the iPad. It is a cellphone-sized mobile device that allows for music, photo, and video downloads, internet access through a wireless network and software in the form of "apps." Bannister studied the use of the iPod Touch in a cart environment, where the devices were checked out to classrooms and delivered using a mobile cart. This study provided a basic and introductory look at the use of the iPod Touch. Banister touts the benefits of allowing students "the internet in your pocket" (p.124), and then begins outlining useful apps by subject. The fact that Apple encouraged users to design their own apps was seen as a positive by Banister who predicted that, "as we move ahead to further define 21st century models of education, surely these mobile devices will play a significant role" (Banister, 2010, p. 130).

Murray and Oclese (2011) also studied apps and hardware but these researchers focused on what "learners might not otherwise be able to do" without an iPad(p. 43) and categorized the apps they studied into four categories. These categories were: (1) tutor, (2) explore, (3) tool, and (4) communicate. These authors did not see a future for the iPad in the educational setting, and thought that software developers would not be willing to use the tablet platform and interfaces. They concluded that the apps that were being developed were targeted at consumption rather than creation.

These studies were conducted very early while exploring the use of these devices in classrooms. This body of literature focused more on the applications that were available rather than on how the use of the device itself could impact learning in the classroom. When studying the iPad, the researchers needed to remember that the iPad was not a traditional computer, and so it could not be evaluated as one. The iPad is a different device that, while allowing the user to perform the same functions as a computer, it requires the researcher to let go of the computer-based processes that are often used when studying different technologies. It must also be remembered that the iPad is more than just a set of applications. There are applications available to support and enhance classroom activities, but the device is not limited only to those applications. There is the ability to access information in the exact moment it is needed, the ability to create information on one device and

share that information with the touch of a finger with a world-wide audience.

Regardless of the device used, 1:1 technology programs are intended to provide students with the ability to access, create and communicate information at the exact moment those functions will have the most impact on the student and their learning.

Research on 1:1 Technology Programs

The research on using 1:1 technology programs in education focuses on studying the aspects of using these devices in classrooms. The majority of the research reviewed here, indicates that students in 1:1 technology programs used technology more than other students, and showed improvements in test scores, student engagement, and attendance.

Typically, the focus of 1:1 program research is studying the amount that students use the technology and measuring the variety of tasks that students use the technology for during instruction. In all of the studies reviewed here, student technology use increased, as did the variety of tasks students performed with the technology.

Several studies in this literature review found increases in student test scores: Bebell and Kay (2010), Bebell and O'Dwyer (2010), Conway Tingen, Argueta, and Stanhope (2010), Corn, and Amberson (2011), Donovan, Green and Hartley (2010). While some test scores did improve,

the scores for math and science consistently improved at lower rates than other test scores. Dunleavy and Heinecke (2008) did not see any effect of test scores by the implementation of a 1:1 technology program. Bebell and Kay (2010) also found that students wrote longer and better essays when using the computers in their 1:1 programs than when the essays were written with a pen and paper.

Other common impacts of 1:1 program research are improved student engagement and improved attendance. Babel and Kay (2010) found that increased engagement was not limited to the classroom when they found that the students in their 1:1 study watched less television and spent more time on schoolwork while at home.

Just as the research found common benefits, the research also identified several challenges. In most studies, teacher support and professional development was mentioned as key to a successful 1:1 technology program but this was usually a recommendation made in the discussion portion of many research studies. Though the majority of the research reviewed here came to common conclusions, the studies reached those conclusions by using different methods of measurement.

Evaluation Models for Studying 1:1 Programs

There are many methods available for measuring the implementation of technology in the classroom, a variety of which were used in the literature discussed here. Among the models used for

evaluation were CBAM, SAMR, Four Categories, and Longstop Protocol and Quick Stop Protocol.

Concerns-based Adoption Model (CBAM)

Though CBAM (Concerns-based Adoption Model) is a change model, it also focuses on the implementation stage of adopting new technologies. Donovan, Green, and Hartley (2010) used this model, "because it is based on school practice and the understanding that change facilitators need to understand the culture of the user system in which the change process is unfolding" (p. 425). CBAM allowed researchers to study the effect of change on the individual while also studying the laptops in a 1:1 educational setting. This method of evaluation allowed the researchers to investigate the entire classroom environment, specifically identifying uses of the technology. The researchers in his study used CBAM to study the type and amount of technology use by the students.

Within the CBAM, the researchers used an Innovation Configuration (IC) Map of the ways the technology was being used by students and teachers (Donovan, Green & Hartley, 2010). The first step for creating an IC Map involved identifying components and variations. This step involves indentifying broad categories of behaviors (Components) and more detailed behaviors (Variations). The second step is to cluster the components and transcribe the dimensions of each

variation into a matrix. At this point the data are more closely analyzed and components are grouped into organizational sections. The third step uses the matrix created in the second step to conduct focused observations and formal reviews. The final step of IC Mapping involves writing narrative to describe the various implementations and configurations of the innovation adoption.

SAMR Model

The SAMR model used by van Oostveen, Muirhead and Goodman (2011) investigated how technology was being implemented in classrooms and measured that use based on the purpose for use. The SAMR model offered four specific categories for describing how technology transformed curriculum. The SAMR model consists of two main levels that evaluate technology use: Enhancement or Transformation. Enhancement includes using technology for a substitution for an already existing tool with no functional change, or for augmentation. In augmentation the technology works as a substitution for an existing tool, but it does so with functional improvement. The Transformation level of SAMR includes using technology for modification, where the technology allows for a significant redesign of the task or redefinition. Redefinition occurs when the technology allows for the creation of new tasks that were previously inconceivable.

Four Categories

Another method of evaluation reviewed is the Four Categories that was developed by Means in 1994 and used in the study by Murray and Oclese (2011). These four categories examine using technology as: (1) Tutor – when technology does the teaching, functioning in a lecture or workbook-like manner; (2) Explore – allows users to make decisions about the information they access; (3) Tool – technology is adapted to function in the educational setting; and, (4) Communicate – user can send messages to others (Murran & Olcese, 2011). The four categories seem to rival SAMR for the most concise educational measurement of 1:1 programs.

Longstop Protocol (LSP) AND Quick Stop Protocol (QSP)

The Longstop Protocol (LSP) and Quickstop Protocol (QSP) were used to study TPACK (Banister & Reinhart, 2010). For the LSP portion of data collection, the researchers randomly visited classes for the entire period, completing three to four observations for each teacher (Banister & Reinhart, 2010). Researchers used the Reformed Teaching Observation Protocol developed by Gross and Hickman (as cited by Banister & Reinhart, 2010, p.13) to measure six areas: (1) lesson design, (2) implementation, (3) content (propositional knowledge and procedural knowledge), (4) communicative interactions in the classroom culture, (5) student and teacher relationships in the classroom culture, and (6)

teaching for social justice. The QSP portion of data collection involved quick five-minute visits to the classrooms recording "the technologies in use, the user, and the type of use" (Banister & Reinhart, 2010, p. 13).

After the data were collected the researchers generated a technology quotient using a technology integration level from the LSP and an average technology indicator technology indicator from the QSP. This method of the LSP and QSP combined with the data conversion to a technology quotient succeeded in converting qualitative data to quantitative data.

This conversion from observational qualitative data that measuring TPACK seems to lend itself to a conversion to numbers and percentages. People seem to like to use these types of data when discussing impact, while also allowing for an easy organization and presentation of that data.

Technological Pedagogical Content Knowledge (TPACK)

The TPACK (Technological Pedagogical Content Knowledge) framework is built on PCK (Pedagogical Content Knowledge) that was conceptualized originally by Shulman (Koehler & Mishra, 2007). The intent of TPACK is to provide teachers with a framework to use when planning successful instruction by incorporating equal aspects of the content to be taught, the pedagogical method used for teaching the content, and the technology used to teach the content.

Some of the other studies reinforced the ideas behind TPACK with research showing that when teachers have ubiquitous access to technology in the classroom, a "considerable number of teachers changed practices to accommodate the opportunities of the increased technology access" (Bebell & O'Dwyer, 2010, p. 10). Reexamining pedagogy with the addition of technology reinforces the very nature of TPACK.

The TPACK framework can provide some difficulties for teachers. Many teachers find that "technology integration is personal" (Hoefer & Swan, 2006, p. 196). In addition, many teachers feel personally about their pedagogical beliefs as well as their content. According to So and Kim (2009), "teachers pedagogical philosophy and beliefs towards educational technology can strongly shape how likely teachers will be to adopt and use technology for different purposes (p. 49). It does not help that "TPACK is a moving target… and varies with a given teacher in different situations" (Hofer & Swan, 2006, p. 196). As new ideas and projects drift out of the teachers comfort zone and further from their past educational experiences, the more difficult it can be for them to try new things (Hofer & Swan, 2006).

A consistent finding across the literature, whether the focus was primarily on 1:1 implementation or on the use of TPACK was that the majority of technology use by teachers was for content delivery with little scaffolding for individual student needs. And most of the tasks

completed by students were fairly low end as far as thinking skills were concerned (So & Kim, 2009). The tasks primarily given to students focused more on remembering, understanding and applying information rather than analyzing, evaluating and creating information (Churches, 2008). The proliferation of these types of tasks show a strong correlation to Holcomb's (2009) multiple references to "laptop lessons" or technology for technology's sake.

So and Kim (2009) suggested that there might be two types of TPACK. Those types are *espoused TPACK,* when teachers can talk about pedagogy and technology implementation and *in use TPACK*, when teachers can transfer their beliefs and knowledge to successfully design a pedagogically-sound and technology-integrated classroom. These two types of TPACK are worth considering when evaluating the research results about technology implementation and 1:1 programs.

Summary

The literature examined in this review varied in focus and method though typically the research had very similar conclusions. Since some studies were completed prior to the release of the iPad2, the focus was on the apps and consumption aspects of the devices. The division in these types of studies occurred when Murray and Oclese (2011) failed to see a future for the device in the educational setting, particularly 1:1

programs, while Banister (2010) thought the iPad would play a significant role in the future of educational technology.

The literature examining the more general 1:1 laptop programs was far more agreeable in the findings. Many of these studies found increases in student test scores as well as improvement in student attendance and engagement in school work, both at school and at home (Babell & Kay, 2010). The literature reviewed here also shared common findings about the challenges in implementing 1:1 programs. Many of the studies revealed that the teacher was the most important factor in implementing technology and found that the support and professional development needed to best assist teachers in implementation consistently needed to be improved.

It is important to note that these consistent findings were determined using multiple methods of evaluation. There were methods that measured the amount of technology used and several assigned the type of use into categories for measurement as in the CBAM, SAMR and Four Categories methods. In addition, Longstop and Quick Stop Protocols were used to translate qualitative observational data into quantitative data for measures easier comparisons.

The research on TPACK seemed to reinforce the findings of the other 1:1 studies and provide some possible reasons for the findings reported there. TPACK provides a tidy framework for examining the most effective methods for delivering instruction to students. However, the

literature reviewed agreed that the aspects of the framework are tied to personal feelings of the instructors which when combined with a fluid view of success can make it difficult for teachers to move past low-level thinking tasks when using technology.

After evaluating a portion of the related research, it was important to determine the most effective method for evaluating and observing the questions for this research project. Though the researcher was unable to find literature using the Technology Integration Matrix to evaluate the use of technology in the classroom, the decision was made to continue with the original plan of using the matrix for evaluation.

Innovation

The innovation for this research project involved the collection of data from an eighth grade U.S. History classroom in a 1:1 iPad program. The focus of the data collected was on the impact of the 1:1 iPad program on the students' learning behaviors as well as the preparation, pedagogy and expectations of the teacher. The data was collected through a combination of the TPACK Survey (See Appendix A), classroom observations and teacher survey (See Appendix B), and student survey (See Appendix C).

This research project will provide the researcher with a guide to better assist the teachers, in the 1:1 iPad program, to continue to combine their content knowledge, pedagogy and technology knowledge

for fullest educational experience for the students. The process and ideas obtained through this research will be used to plan professional development and technology integration work with teachers in the 1:1 iPad program.

Membership

The teacher in this research project is an eighth grade U.S. History teacher in a smaller district in Iowa. The district is a combination of a suburban, small college town and a rural district. The teacher has been teaching in the district for seventeen years. The first nine years were as an at-risk teacher and the last eight were as an eighth grade U.S. History teacher. The teacher is in the nearing the end of the first year of a 1:1 iPad program in the district. The teacher in this study wants his students to think deeply about the content and make connections between that content and the real-world. He is willing to experiment with the delivery of his instruction to find new ways of reaching his students, but not without first determining there is a benefit in that experiment.

In addition to the teacher's willing to experiment with instruction, he is also fairly tech savvy. Even with these considerations, I knew the teacher had not made as many adjustments in his instruction as other teachers in the building. The expectation for the impact of the 1:1 iPad program in this teacher's classroom was pretty middle-of-the road. This

expectation made the teacher a good guide to predict where the other teachers in the building would fall in the levels of implementation of the iPad in their classrooms.

The students in research project are mostly from a middle class and upper-middle class socio-economic background with a few students from a rural and lower socio-economic background. Regardless of background, a great majority of students are comfortable using technology in the classroom. These students are also fairly comfortable using mobile devices outside of school. The students have always been encouraged to use the technologies available to them at home and at school to facilitate their learning but now have the opportunity to use that technology to enhance their learning anywhere at anytime.

Negotiations

Before this research project began, permission was obtained from the building administrators to observe classes, and survey the teacher and students. These contacts with the administrators and the teacher were done through email. A portion of the students in the observed classrooms were given an opportunity to answer a short survey on a voluntary basis. This contact was also done through email. Because the intent of this research project was not to publish, and the researcher was a member of the same school, parental permission was not obtained for

the observations or survey. This would change if the research was to be conducted on a grander scale.

Timeline

Phase 1 – (January and March 2012) Identified area of focus, identified research questions , identified teacher for study, literature found for review

Phase 2 – (March 2012) Completed introduction, membership, negotiations, and method of data collection

Phase 3 – (April 1- 13) Collected and analyzed data, revised literature review

Phase 4 – (April 14-28) Interpreted data, Completed Action Planning, Compiled Action Research project and presentation

Data Collection and Analysis

Data Collection

The data collection for this research project occurred through three different methods. The first method was the completion of an adapted version of the TPACK Survey. The TPACK survey was used to discover the level of comfort and knowledge the teacher had with technology, content, pedagogy as well as the combination of those into pedagogical-content and technology-content knowledge, and technology-pedagogical knowledge.

The second method was through classroom observations using the Technology Integration Matrix as a measurement tool (See Appendix D). The Technology Integration Matrix allowed the researcher to measure the level of technology integration and the characteristics of the learning environment at the same time. The matrix measures technology integration in five levels: (1) entry level, which includes the use of technology as a delivery tool, (2) adoption, which is a conventional use of technology, (3) adaptation happens when students select the tools and adapt those to their needs, (4) infusion occurs when the learning environment infuses technology throughout the day and across subject areas, and (5) transformation, which sees students engaging in activities that would be impossible without the technology. The classroom environment is also divided into five levels: (1) active, sees students engaged in using technology as a tool, (2) collaborative occurs when students use the technology to collaborate with others, (3) constructive sees the students using the technology to build understanding, (4) authentic is the use of the technology to solve real-world problems, and (5) goal directed has students using technology to set goals, plan activities and monitor progress (Appendix D). The two aspects addressed in the matrix combine to end with a transformative, goal-directed environment as the highest standard. There were five of these observations over the course of two weeks. The timeframe of these observations allowed the researcher to observe classes while they studied

the same broad topic while still providing the opportunity for the researcher to observe different activities in the classroom.

The final method of data collection was in the form of separate teacher and student email surveys. These surveys occurred after the observations were completed. The teacher survey was intended to obtain the teacher's perception of any changes in their own approach to teaching, preparation, communication, expectations, and management of the classroom environment. The focus of the student survey was to gauge any change in the students' approach to their schoolwork and their communication with their teachers. The researcher also wanted to learn of the students' perception of any changes in the way their teacher conducted the classroom and assignments. The information in Table 1 shows how these methods of data collection were used to answer the research questions.

Research Questions	Data Source 1	Data Source 2	Data Source 3	Data Source 4
What impact does a 1:1 iPad program had on student learning in an 8th grade US History classroom?	Observation and Field Notes	Teacher TPACK Survey	Teacher Interview	Student Interview
How have students changed their learning behaviors while using the iPad in a 1:1 program?	Observation and Field Notes			Student Interview
How have the teachers changed their pedagogy, preparation, and expectations while using the iPad with students in a 1:1 program?	Observation and Field Notes	Teacher TPACK Survey	Teacher Interview	

Table 1

Data Analysis

TPACK Survey

The TPACK Survey was delivered to the teacher in order to gauge the teacher's view of his knowledge and comfort in the areas covered in the survey. The main area of interest for the researcher in relation to content was social studies, the teacher's subject area. In the areas of Content Knowledge and Pedagogical Knowledge, the teacher consistently chose "Strongly Agree," the most positive option, when evaluating his abilities in those two areas (See Appendix E). In the areas of Technology Knowledge and Technological and Pedagogical Knowledge, the teacher

still ranked his knowledge positively but not with the consistent "Strongly Agree" that the other areas received. In these areas, the teacher chose "Agree" as his ranking in all but two areas. Those areas were "keeping up with new technologies" and "possessing the skills needed to use technology." These two areas received a "Strongly Agree" ranking also.

Observations

The classroom observations showed scattered results about the technology integration and classroom environment. There were days when there was no technology use, days when the use was very low level, and days where it was used by students as students needed. Table 3 illustrates the technology use and classroom environments recorded during the observations. The descriptions in the table are simplified versions of the descriptions found in the matrix itself. The numbers in the table refer to the day of observation.

Technology Integration Matrix	Entry	Adoption	Adaptation	Infusion	Transformative
Active	1			2,3,5	3,5
Collaborative	1	2	4,5	3,4	
Constructive	1,2,5	4	2,3,4	2,4	
Authentic	1,2,5	2,3	4		
Goal Directed	1	2	3,5		

Table 2

The observation on the first day (See Appendix F) found the students using Naiku testing software to access and take a test on their iPads. This entry level use is the equivalent of drill and practice and has the students working alone to receive and deliver information with little tie to the real-world.

The second observation (See Appendix G) occurred on a day when the students were working alone or in groups to make connections between events leading up to the Civil War. The reason behind making the intended connections was for students to discover how these events contributed to the outbreak of the war, and in making that discovery see that the Civil War was about more than slavery. This activity still saw some entry level scores in the communication and authentic sections but the students had more control over the tools and methods they used to accomplish the task and were encouraged to collaborate though they were all responsible for their own work.

The third observation (See Appendix H) saw similar activity as the second though the task had changed. This observation saw the students working on an election campaign. Their task was to work with a group to get a real politician from that time period elected. They had to know the positions and statements made by the candidate on the relevant issues and also needed to know information about their opponent that they could use while campaigning. The classroom functioned very much like it had in previous observation. Students were using the tools available to them in ways they chose to find the necessary information and convert that information into usable formats to accomplish their goal of getting their candidate elected.

On the fourth day of observation (See Appendix I), there was very minimal use of technology in the classroom. Though there was very little technology use, the scores for the day were still mainly in the adaption and infusion categories because of the activities and discussion in which th students were participating. The students used copies of the Declaration of Independence, the Bill of Rights, and the Constitution to justify the right of the southern states to leave the Union or provide reasons why they couldn't

The last day of observation (See Appendix J) found the students again working on their own projects worked on during previous observations. During this time, the teacher encouraged the students to collaborize and help each other accomplish their goals. This

environment also saw the technology use towards the upper levels of the matrix.

The classroom observations were followed by the teacher and student surveys. These surveys were used to gauge the perceptions of the teacher and students about the use of the iPads and the classroom environment so these could be compared to the information gathered by the observations.

Teacher Survey

"I want kids to experience history more so than be told what happens" (the teacher, Appendix K). As the teacher thought about his approach to teaching, he related that he tried to create an experience for his students. The experience the teacher tries to create for his students involves having them solve problems, reenact events, judge past events and draw conclusions about those events and the effects they have on one another. The teacher found himself delivering less content to the students with the addition of the iPad to the classroom. Instead of delivering content, he found himself working more to clarify issues for the students.

Communication with the students changed with the addition of the iPad. The teacher made the move to a paperless classroom through the use of the app Neu.Annotate, email, and a class website. Information and assignments was exchanged with students through these methods.

Email was a heavily used tool that allowed the teacher to get materials to students before class, increasing their preparation for the class period. Email also allowed the teacher to assist his students outside of the school day. He could provide them assistance when they needed it, whenever that might be. The ability to provide students with materials before class decreased the amount of time the teacher spent explaining concepts and directions to students since the students were able to prepare and clarify questions before the class period.

The iPad and email also made student absences less of an issue. The student still had access to class materials when the rest of the students received them and were able to obtain class notes immediately after the class period was over. There was an instance when a student participated in the classroom activity from Saudi Arabia (Appendix K).

The teacher found that he had higher expectations of the students after the addition of the iPad. He expected better assignment completion from the students and more self direction from them. He also expected a higher quality in the students' work "because I know the technology evens the playing field a bit. They all have access to the internet, apps and content so economic status and ability is blurred a bit in what I see from student products" (The Teacher, Appendix K).

Student Survey

While the teacher survey answers provided the researcher with the "designer" view of the use of technology and the educational setting, the student survey answers provided the researcher with the "user" view. The students had a positive response to the 1:1 iPad program and were able to provide the researcher with information about where the iPad had the most impact and where there was still room for improvement.

"It is harder to have a legitimate excuse as to why you don't have your homework done" (Student 2, Appendix L). The other students who filled out the survey felt the same way as Student 2. They felt more organized with the iPad and felt it was easier to accomplish their school work since everything they needed was there on one thing. Only Student 1 felt it was more difficult to keep track of assignments and get work done with the iPad.

As with the teacher, the students mentioned email multiple times in their survey responses. The students liked that they didn't have to wait until the next class period to get help from the teacher, they could get that help whenever they needed it as they were working on the assignment. In addition to access to the teacher through email, the students also had access to their classmates when they needed. The students felt this helped them be more prepared for class after an absence because they were able to get notes from class right when class was over instead of the next day as was previously done. The students

also liked that this made group work easier since they had easier asscess to their groupmates through email. The students also noted that the majority of their assignments were now given and collected via email.

The student responses to the question about their assignments were interesting. The students felt that there assignments were more self-directed. They felt they were more in charge of how and when they completed the assignments. They also felt that the classes and assignments were more research-based and felt they were finding the answers on their own more so than before the iPad program. The students felt they had more time to complete the assignments since they were no longer due in class or at the end of the school day, as Student 2 noted, "technically we have a longer time to get projects done if we can turn it in before the night is over. I have turned in a couple projects at 10 o'clock, and it's not late. It's nice to have the extra time" (Appendix L). Though the students talked positively about the impact the 1:1 iPad program had on their assignments, there wasn't the impression that the assignments themselves had changed.

Findings

The data collected showed that the assumption that the teacher in this study would be "middle-of the-road" in regards to the implementation of the 1:1 iPad program was correct. The teacher provided an environment where students were encouraged to find their

own answers, make connections and collaborate with their peers. However, this was accomplished by taking his previous activities and completing them on the iPad. The activities in his classroom, could be completed without the iPad leaving the teacher still in need of assistance in achieving the transformative level of technology integration.

Based on conversations with the teacher prior to this research project, I was surprised by the high rankings he gave himself on the TPACK survey in the areas of Technological Content and Technological Pedagogical. These earlier conversations portrayed a teacher who was having difficulty moving his technology use to facilitate more higher-order thinking skills in a transformative learning environment. This teacher was essentially teaching as he had the year before but with iPads. This approach is not uncommon for teachers in the first year of a 1:1 program, but it did not match with the answers on the TPACK survey.

The classroom observations were comforting. Though the main scores fell in the middle of the Technology Integration Matrix with the majority of the results falling in the adaptation, collaborative and constructive columns, there were still good results in the infusion area. The difference was that the results in the infusion area occurred when technology was not in use. The infusion behaviors were present in the classroom but not with technology.

The teacher's responses on the follow-up Teacher Survey reinforced the observation results of scoring higher on the Technology Integration Matrix without the use of technology. This occurred because the teacher already was working to create an authentic and goal-directed learning environment. Assisting the teacher in seeing how the iPad can expand this type of learning environment for his students, will encourage the teacher to further integrate the iPad into his curriculum and push it mirror the other approaches to education that he employs in the classroom.

The student responses were very important in this research project because this is really where the potential to see a disconnect between what the teacher thought was happening in the classroom and what the students' perceived as the reality of the classroom. I did think there was one area of disconnect and this was in the types of assignments. Though the students felt they were completing their assignments differently, they didn't seem to feel that they were really being asked to do different types of assignments with the iPads. It was as if the students felt that any differences in the assignments were their doing and not the teachers.

The students' responses were positive in the use of the iPad when it came to organization and communication. The students seemed to appreciate being able to find their own answers and be more in control of their learning. Most of the students appreciated having everything they needed in one easy to carry package. They liked the fact that they could

work on their assignments when it worked best for them. And they liked getting answers and assistance from the teacher when it was the most needed. These last two points were really the most important as far the impact they can have on the classroom. The willingness of the students to work and communicate outside of school shows that they are ready to make the changes that a 1:1 program can provide. This willingness of the students to expand their school day provides teachers with the opportunity to try new approaches to the content. The next step is determining ways to help teachers with those new approaches.

Action Plan

The intended purpose of this research project is to describe the impact of a 1:1 iPad program on a specific classroom. The researcher wanted to determine if the program had an impact on the student learning behaviors and the teacher's pedagogy, expectations and preparation for instruction. The data collected during the research process will be used for two different courses of action.

The first course of action involves working with the teacher that served as the subject for this research project. The researcher will now work as a resource for this teacher using the general stage of technology integration based on the Technology Integration Matrix and the survey answers to plan professional development opportunities that would assist the teacher in continuing to implement the 1:1 iPad in his

classroom. These opportunities would allow the teacher to work on his own, with his team members, in the buildings Technology Club and during PLC (Professional Learning Community) time to further increase his Technological Pedagogical and Content Knowledge to further move the activities in his classroom towards the Transformation column of the Technology Integration Matrix.

In addition to the professional development opportunities, the researcher will work with the classroom teacher collaborating to plan and deliver shifts in instructional opportunities in the classroom. The researcher will work at modeling instructional methods while also assisting the teacher and students in continuing to shift their learning environment.

The second course of action involves expanding the research project and repeating the survey and observation processes with other teachers in the building. The repetition of the processes will allow the researcher to determine the general stage in the Technology Integration Matrix, and TPACK comfort and knowledge. The researcher would then use that data in the same manner as with the subject teacher to plan individualized professional development and methods to meet their needs for collaboration and integration assistance.

This research project has provided me with a method and course of action for assisting the teachers in my building to better meet the needs of their students with the tools available to them, mainly the 1:1 iPad

program. The next phase and repetition of the process followed in this research project will help the teachers move towards a more goal-directed transformative learning environment, meeting the needs of their students in more individualized ways at the moment they are needed.

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Appendix A

TPACK Survey

Technology is a broad concept that can mean a lot of different things. For the purpose of this questionnaire, technology is referring to digital technology/technologies. That is, the digital tools we use such as computers, laptops, iPods, handhelds, interactive whiteboards, software programs, etc. Please answer all of the questions and if you are uncertain of or neutral about your response you may always select "Neither Agree or Disagree"

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
TK (Technology Knowledge)					
1. I know how to solve my own technical problems.					
2. I can learn technology easily.					
3. I keep up with important new technologies.					
4. I frequently play around the technology.					
5. I know about a lot of different technologies.					
6. I have the technical skills I need to use technology.					
CK (Content Knowledge)					
Mathematics					
7. I have sufficient knowledge about mathematics.					
8. I can use a mathematical way of thinking.					
9. I have various ways and strategies of developing my understanding of mathematics.					
Social Studies					
10. I have sufficient knowledge about social studies.					
11. I can use a historical way of thinking.					
12. I have various ways and strategies of developing my understanding of social studies.					
Science					
13. I have sufficient knowledge about science.					
14. I can use a scientific way of thinking.					
15. I have various ways and strategies of developing my understanding of science.					
Literacy					
16. I have sufficient knowledge about literacy.					
17. I can use a literary way of thinking.					
18. I have various ways and strategies of developing my understanding of literacy.					

PK (Pedagogical Knowledge)					
19. I know how to assess student performance in a classroom.					
20. I can adapt my teaching based-upon what students currently understand or do not understand.					
21. I can adapt my teaching style to different learners.					
22. I can assess student learning in multiple ways.					
23. I can use a wide range of teaching approaches in a classroom setting.					
24. I am familiar with common student understandings and misconceptions.					
25. I know how to organize and maintain classroom management.					

PCK (Pedagogical Content Knowledge)					
26. I can select effective teaching approaches to guide student thinking and learning in mathematics.					
27. I can select effective teaching approaches to guide student thinking and learning in literacy.					
28. I can select effective teaching approaches to guide student thinking and learning in science.					
29. I can select effective teaching approaches to guide student thinking and learning in social studies.					
TCK (Technological Content Knowledge)					
30. I know about technologies that I can use for understanding and doing mathematics.					
31. I know about technologies that I can use for understanding and doing literacy.					
32. I know about technologies that I can use for understanding and doing science.					
33. I know about technologies that I can use for understanding and doing social studies.					

TPK (Technological Pedagogical Knowledge)					
34. I can choose technologies that enhance the teaching approaches for a lesson.					
35. I can choose technologies that enhance students' learning for a lesson.					
36. My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.					
37. I am thinking critically about how to use technology in my classroom.					
38. I can adapt the use of the technologies that I am learning about to different teaching activities.					
39. I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.					
40. I can use strategies that combine content, technologies and teaching approaches that I learned about in my coursework in my classroom.					
41. I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school and/or district.					
42. I can choose technologies that enhance the content for a lesson.					

TPACK (Technology Pedagogy and Content Knowledge)					
43. I can teach lessons that appropriately combine mathematics, technologies and teaching approaches.					
44. I can teach lessons that appropriately combine literacy, technologies and teaching approaches.					
45. I can teach lessons that appropriately combine science, technologies and teaching approaches.					
46. I can teach lessons that appropriately combine social studies, technologies and teaching approaches.					

Models of TPACK (Faculty, PreK-6 teachers)					
47. My mathematics education professors appropriately model combining content, technologies and teaching approaches in their teaching.					
48. My literacy education professors appropriately model combining content, technologies and teaching approaches in their teaching.					
49. My science education professors appropriately model combining content, technologies and teaching approaches in their teaching.					
50. My social studies education professors appropriately model combining content, technologies and teaching approaches in their teaching.					
51. My instructional technology professors appropriately model combining content, technologies and teaching approaches in their teaching.					
52. My educational foundation professors appropriately model combining content, technologies and teaching approaches in their teaching.					
53. My professors outside of education appropriately model combining content, technologies and teaching approaches in their teaching.					
54. My PreK-6 cooperating teachers appropriately model combining content, technologies and teaching approaches in their teaching.					

	25% or less	*26% - 50%*	*51% - 75%*	*76%-100%*
Models of TPCK				
55. In general, approximately what percentage of your teacher education professors have provided an effective model of combining content, technologies and teaching approaches in their teaching?				
56. In general, approximately what percentage of your professors outside of teacher education have provided an effective model of combining content, technologies and teaching approaches in their teaching?				
57. In general, approximately what percentage of the PreK-6 cooperating teachers have provided an effective model of combining content, technologies and teaching approaches in their teaching?				

Please complete this section by writing your responses in the boxes.

73. Describe a specific episode where an ISU professor or instructor effectively demonstrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content was being taught, what technology was used, and what teaching approach(es) was implemented.

74. Describe a specific episode where one of your PreK-6 cooperating teachers effectively demonstrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content was being taught, what technology was used, and what teaching approach(es) was implemented. If you have not observed a teacher modeling this, please indicate that you have not.

75. Describe a specific episode where you effectively demonstrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content you taught, what technology you used, and what teaching approach(es) you implemented. If you have not had the opportunity to teach a lesson, please indicate that you have not.

Appendix B

Teacher Survey

1. How would you describe your approach to teaching?

2. Has the iPad changed your approach to the way you teach your students?

3. Has the iPad change the way you run/manage your classroom?

4. Describe any differences in the way you prepare instruction now that you have the iPad compared to before you had the iPad.

5. Describe any differences in communication pre and post iPad with your students.

6. Do you have different expectations of your students' performance and behaviors now that they have the iPad?

Appendix C

Student Survey

1. How has the iPad changed how you approach your school work? How you keep track of your schoolwork, how you complete your school work, etc.

2. How has the iPad changed how you communicate with your teachers? With the other students in class?

3. How has the iPad changed the way your teachers run their classrooms? Deliver instruction? Assign or collect assignments?

4. How do you think the iPad has changed the types of assignments that your teachers assign you?

Appendix D

Integration Matrix

Technology Integration Matrix	Levels of Technology Integration into the Curriculum				
	Entry: The teacher uses technology to deliver curriculum content to students.	**Adoption:** The teacher directs students in the conventional use of tool-based software. If such software is available, this level is the recommended entry point.	**Adaptation:** The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.	**Infusion:** The teacher creates a learning environment that infuses the power of technology tools throughout the day and across subject areas.	**Transformation:** The teacher creates a rich learning environment in which students regularly engage in activities that would have been impossible to achieve without technology.
Characteristics of the Learning Environment					
Active: Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.	Students use technology for drill and practice and computer based training.	Students begin to utilize technology tools to create products, for example using a word processor to create a report.	Students have opportunities to select and modify technology tools to accomplish specific purposes, for example using colored cells on a spreadsheet to plan a garden.	Throughout the school day, students are empowered to select appropriate technology tools and actively apply them to the tasks at hand.	Given ongoing access to online resources, students actively select and pursue topics beyond the limitations of even the best school library.
Collaborative: Students use technology tools to collaborate with others rather than working individually at all times.	Students primarily work alone when using technology.	Students have opportunities to utilize collaborative tools, such as email, in conventional ways.	Students have opportunities to select and modify technology tools to facilitate collaborative work.	Throughout the day and across subject areas, students utilize technology tools to facilitate collaborative learning.	Technology enables students to collaborate with peers and experts irrespective of time zone or physical distances.
Constructive: Students use technology tools to build understanding rather than simply receive information.	Technology is used to deliver information to students.	Students begin to utilize constructive tools such as graphic organizers to build upon prior knowledge and construct meaning.	Students have opportunities to select and modify technology tools to assist them in the construction of understanding.	Students utilize technology to make connections and construct understanding across disciplines and throughout the day.	Students use technology to construct, share, and publish knowledge to a worldwide audience.
Authentic: Students use technology tools to solve real-world problems meaningful to them rather than working on artificial assignments.	Students use technology to complete assigned activities that are generally unrelated to real-world problems.	Students have opportunities to apply technology tools to some content-specific activities that are based on real-world problems.	Students have opportunities to select and modify technology tools to solve problems based on real-world issues.	Students select appropriate technology tools to complete authentic tasks across disciplines.	By means of technology tools, students participate in outside-of-school projects and problem-solving activities that have meaning for the students and the community.
Goal Directed: Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	Students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate.	From time to time, students have the opportunity to use technology to either plan, monitor, or evaluate an activity.	Students have opportunities to select and modify the use of technology tools to facilitate goal-setting, planning, monitoring, and evaluating specific activities.	Students use technology tools to set goals, plan activities, monitor progress, and evaluate results throughout the curriculum.	Students engage in ongoing metacognative activities at a level that would be unattainable without the support of technology tools.

Appendix E

TPACK Survey -- Completed

Technology is a broad concept that can mean a lot of different things. For the purpose of this questionnaire, technology is referring to digital technology/technologies. That is, the digital tools we use such as computers, laptops, iPods, handhelds, interactive whiteboards, software programs, etc. Please answer all of the questions and if you are uncertain of or neutral about your response you may always select "Neither Agree or Disagree"

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
TK (Technology Knowledge)					
1. I know how to solve my own technical problems.				X	
2. I can learn technology easily.				X	
3. I keep up with important new technologies.					X
4. I frequently play around the technology.				X	
5. I know about a lot of different technologies.				X	
6. I have the technical skills I need to use technology.					X
CK (Content Knowledge)					
Mathematics					
7. I have sufficient knowledge about mathematics.				X	
8. I can use a mathematical way of thinking.				X	
9. I have various ways and strategies of developing my understanding of mathematics.				X	
Social Studies					
10. I have sufficient knowledge about social studies.					X
11. I can use a historical way of thinking.					X
12. I have various ways and strategies of developing my understanding of social studies.					X
Science					
13. I have sufficient knowledge about science.				X	
14. I can use a scientific way of thinking.				X	
15. I have various ways and strategies of developing my understanding of science.				X	
Literacy					
16. I have sufficient knowledge about literacy.		X			
17. I can use a literary way of thinking.		X			
18. I have various ways and strategies of developing my understanding of literacy.		X			

PK (Pedagogical Knowledge)					
19. I know how to assess student performance in a classroom.					X
20. I can adapt my teaching based-upon what students currently understand or do not understand.					X
21. I can adapt my teaching style to different learners.					X
22. I can assess student learning in multiple ways.					X
23. I can use a wide range of teaching approaches in a classroom setting.					X
24. I am familiar with common student understandings and misconceptions.					X
25. I know how to organize and maintain classroom management.					X

PCK (Pedagogical Content Knowledge)					
26. I can select effective teaching approaches to guide student thinking and learning in mathematics.		X			
27. I can select effective teaching approaches to guide student thinking and learning in literacy.		X			
28. I can select effective teaching approaches to guide student thinking and learning in science.		X			
29. I can select effective teaching approaches to guide student thinking and learning in social studies.					X
TCK (Technological Content Knowledge)					
30. I know about technologies that I can use for understanding and doing mathematics.			X		
31. I know about technologies that I can use for understanding and doing literacy.		X			
32. I know about technologies that I can use for understanding and doing science.		X			
33. I know about technologies that I can use for understanding and doing social studies.					X

TPK (Technological Pedagogical Knowledge)					
34. I can choose technologies that enhance the teaching approaches for a lesson.				X	
35. I can choose technologies that enhance students' learning for a lesson.				X	
36. My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.				X	
37. I am thinking critically about how to use technology in my classroom.				X	
38. I can adapt the use of the technologies that I am learning about to different teaching activities.				X	
39. I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.				X	
40. I can use strategies that combine content, technologies and teaching approaches that I learned about in my coursework in my classroom.				X	
41. I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school and/or district.				X	
42. I can choose technologies that enhance the content for a lesson.				X	

TPACK (Technology Pedagogy and Content Knowledge)					
43. I can teach lessons that appropriately combine mathematics, technologies and teaching approaches.		X			
44. I can teach lessons that appropriately combine literacy, technologies and teaching approaches.			X		
45. I can teach lessons that appropriately combine science, technologies and teaching approaches.		X			
46. I can teach lessons that appropriately combine social studies, technologies and teaching approaches.					X

Models of TPACK (Faculty, PreK-6 teachers)					
47. My mathematics education professors appropriately model combining content, technologies and teaching approaches in their teaching.			X		
48. My literacy education professors appropriately model combining content, technologies and teaching approaches in their teaching.			X		
49. My science education professors appropriately model combining content, technologies and teaching approaches in their teaching.			X		
50. My social studies education professors appropriately model combining content, technologies and teaching approaches in their teaching.				X	
51. My instructional technology professors appropriately model combining content, technologies and teaching approaches in their teaching.					X
52. My educational foundation professors appropriately model combining content, technologies and teaching approaches in their teaching.				X	
53. My professors outside of education appropriately model combining content, technologies and teaching approaches in their teaching.			X		
54. My PreK-6 cooperating teachers appropriately model combining content, technologies and teaching approaches in their teaching.			X		

	25% or less	*26% - 50%*	*51% - 75%*	*76%-100%*
Models of TPCK				
55. In general, approximately what percentage of your teacher education professors have provided an effective model of combining content, technologies and teaching approaches in their teaching?		X		
56. In general, approximately what percentage of your professors outside of teacher education have provided an effective model of combining content, technologies and teaching approaches in their teaching?		X		
57. In general, approximately what percentage of the PreK-6 cooperating teachers have provided an effective model of combining content, technologies and teaching approaches in their teaching?		X		

Please complete this section by writing your responses in the boxes.

73. Describe a specific episode where an ISU professor or instructor effectively demonstrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content was being taught, what technology was used, and what teaching approach(es) was implemented.

N/A

74. Describe a specific episode where one of your PreK-6 cooperating teachers effectively demonstrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content was being taught, what technology was used, and what teaching approach(es) was implemented. If you have not observed a teacher modeling this, please indicate that you have not.

N/A

75. Describe a specific episode where you effectively demonstrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content you taught, what technology you used, and what teaching approach(es) you implemented. If you have not had the opportunity to teach a lesson, please indicate that you have not.

GOOLE SITE! PLC
NAIKU PLC, TEACHER WEBSITE

Appendix F

Observation – Day 1

8th US History - 1 Test

Technology Integration Matrix

Characteristics of the Learning Environment	Levels of Technology Integration into the Curriculum					
	Entry: The teacher uses technology to deliver curriculum content to students.	**Adoption:** The teacher directs students in the conventional use of tool-based software. If such software is available, this level is the recommended entry point.	**Adaptation:** The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.	**Infusion:** The teacher creates a learning environment that infuses the power of technology tools throughout the day and across subject areas.	**Transformation:** The teacher creates a rich learning environment in which students regularly engage in activities that would have been impossible to achieve without technology.
Active: Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.	Students use technology for drill and practice and computer based training.	Students begin to utilize technology tools to create products, for example using a word processor to create a report.	Students have opportunities to select and modify technology tools to accomplish specific purposes, for example using colored cells on a spreadsheet to plan a garden.	Throughout the school day, students are empowered to select appropriate technology tools and actively apply them to the tasks at hand.	Given ongoing access to online resources, students actively select and pursue topics beyond the limitations of even the best school library.
Collaborative: Students use technology tools to collaborate with others rather than working individually at all times.	Students primarily work alone when using technology.	Students have opportunities to utilize collaborative tools, such as email, in conventional ways.	Students have opportunities to select and modify technology tools to facilitate collaborative work.	Throughout the day and across subject areas, students utilize technology tools to facilitate collaborative learning.	Technology enables students to collaborate with peers and experts irrespective of time zone or physical distances.
Constructive: Students use technology tools to build understanding rather than simply receive information.	Technology is used to deliver information to students. receive info from students	Students begin to utilize constructive tools such as graphic organizers to build upon prior knowledge and construct meaning.	Students have opportunities to select and modify technology tools to assist them in the construction of understanding.	Students utilize technology to make connections and construct understanding across disciplines and throughout the day.	Students use technology to construct, share, and publish knowledge to a worldwide audience.
Authentic: Students use technology tools to solve real-world problems meaningful to them rather than working on artificial assignments.	Students use technology to complete assigned activities that are generally unrelated to real-world problems.	Students have opportunities to apply technology tools to some content-specific activities that are based on real-world problems.	Students have opportunities to select and modify technology tools to solve problems based on real-world issues.	Students select appropriate technology tools to complete authentic tasks across disciplines.	By means of technology tools, students participate in outside-of-school projects and problem-solving activities that have meaning for the students and the community.
Goal Directed: Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	Students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate.	From time to time, students have the opportunity to use technology to either plan, monitor, or evaluate an activity.	Students have opportunities to select and modify the use of technology tools to facilitate goal-setting, planning, monitoring, and evaluating specific activities.	Students use technology tools to set goals, plan activities, monitor progress, and evaluate results throughout the curriculum.	Students engage in ongoing metacognative activities at a level that would be unattainable without the support of technology tools.

use naiku software for quiz on iPads
- teacher creates test
- state standards in software
- allows measurement of core
- if student shows previous mastery of process → can opt out & focus on assignment in ☺

Appendix G

Observation – Day 2

8th U.S. History – 2 "Things" work

Technology Integration Matrix	Levels of Technology Integration into the Curriculum				
	Entry: The teacher uses technology to deliver curriculum content to students.	**Adoption:** The teacher directs students in the conventional use of tool-based software. If such software is available, this level is the recommended entry point.	**Adaptation:** The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.	**Infusion:** The teacher creates a learning environment that infuses the power of technology tools throughout the day and across subject areas.	**Transformation:** The teacher creates a rich learning environment in which students regularly engage in activities that would have been impossible to achieve without technology.
Characteristics of the Learning Environment					
Active: Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.	Students use technology for drill and practice and computer based training.	Students begin to utilize technology tools to create products, for example using a word processor to create a report.	Students have opportunities to select and modify technology tools to accomplish specific purposes, for example using colored cells on a spreadsheet to plan a garden.	Throughout the school day, students are empowered to select appropriate technology tools and actively apply them to the tasks at hand.	Given ongoing access to online resources, students actively select and pursue topics beyond the limitations of even the best school library.
Collaborative: Students use technology tools to collaborate with others rather than working individually at all times.	Students primarily work alone when using technology.	Students have opportunities to utilize collaborative tools, such as email, in conventional ways.	Students have opportunities to select and modify technology tools to facilitate collaborative work.	Throughout the day and across subject areas, students utilize technology tools to facilitate collaborative learning.	Technology enables students to collaborate with peers and experts irrespective of time zone or physical distances.
Constructive: Students use technology tools to build understanding rather than simply receive information.	email + website Technology is used to deliver information to students.	Students begin to utilize constructive tools such as graphic organizers to build upon prior knowledge and construct meaning.	Students have opportunities to select and modify technology tools to assist them in the construction of understanding.	Students utilize technology to make connections and construct understanding across disciplines and throughout the day. teacher specific subject	Students use technology to construct, share, and publish knowledge to a worldwide audience.
Authentic: Students use technology tools to solve real-world problems meaningful to them rather than working on artificial assignments.	Students use technology to complete assigned activities that are generally unrelated to real-world problems.	Students have opportunities to apply technology tools to some content-specific activities that are based on real-world problems.	Students have opportunities to select and modify technology tools to solve problems based on real-world issues.	Students select appropriate technology tools to complete authentic tasks across disciplines.	By means of technology tools, students participate in outside-of-school projects and problem-solving activities that have meaning for the students and the community.
Goal Directed: Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	Students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate.	From time to time, students have the opportunity to use technology to either plan, monitor, or evaluate an activity. reflection sheet	Students have opportunities to select and modify the use of technology tools to facilitate goal-setting, planning, monitoring, and evaluating specific activities.	Students use technology tools to set goals, plan activities, monitor progress, and evaluate results throughout the curriculum.	Students engage in ongoing metacognative activities at a level that would be unattainable without the support of technology tools.

– in earlier class teacher presented intro info
- students found rest
– make connections between events in CW
– present info + connections in DST form for student

What happened?
Who was involved?
Why did it happen?
Where did it happen?
How was it resolved?

?

teacher led – but student driven – student kept + student chosen goals

Appendix H

Observation – Day 3

US History 5
Campaign work

Technology Integration Matrix

Characteristics of the Learning Environment	Levels of Technology Integration into the Curriculum				
	Entry: The teacher uses technology to deliver curriculum content to students.	**Adoption:** The teacher directs students in the conventional use of tool-based software. If such software is available, this level is the recommended entry point.	**Adaptation:** The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.	**Infusion:** The teacher creates a learning environment that infuses the power of technology tools throughout the day and across subject areas. in 1 subject today	**Transformation:** The teacher creates a rich learning environment in which students regularly engage in activities that would have been impossible to achieve without technology.
Active: Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.	Students use technology for drill and practice and computer based training.	Students begin to utilize technology tools to create products, for example using a word processor to create a report.	Students have opportunities to select and modify technology tools to accomplish specific purposes, for example using colored cells on a spreadsheet to plan a garden.	Throughout the school day, students are empowered to select appropriate technology tools and actively apply them to the task at hand. X	Given ongoing access to online resources, students actively select and pursue topics beyond the limitations of even the best school library.
Collaborative: Students use technology tools to collaborate with others rather than working individually at all times.	Students primarily work alone when using technology.	Students have opportunities to utilize collaborative tools, such as email, in conventional ways.	Students have opportunities to select and modify technology tools to facilitate collaborative work.	Throughout the day and across subject areas, students utilize technology tools to facilitate collaborative learning. X	Technology enables students to collaborate with peers and experts irrespective of time zone or physical distances.
Constructive: Students use technology tools to build understanding rather than simply receive information.	Technology is used to deliver information to students.	Students begin to utilize constructive tools such as graphic organizers to build upon prior knowledge and construct meaning.	Students have opportunities to select and modify technology tools to assist them in the construction of understanding. X	Students utilize technology to make connections and construct understanding across disciplines and throughout the day. subjects specific	Students use technology to construct, share, and publish knowledge to a worldwide audience. not outside
Authentic: Students use technology tools to solve real-world problems meaningful to them rather than working on artificial assignments.	Students use technology to complete assigned activities that are generally unrelated to real-world problems.	Students have opportunities to apply technology tools to some content-specific activities that are based on real-world problems. X	Students have opportunities to select and modify technology tools to solve problems based on real-world issues.	Students select appropriate technology tools to complete authentic tasks across disciplines.	By means of technology tools, students participate in outside-of-school projects and problem-solving activities that have meaning for the students and the community.
Goal Directed: Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	Students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate.	From time to time, students have the opportunity to use technology to either plan, monitor, or evaluate an activity.	Students have * opportunities to select and modify the use of technology tools to facilitate goal-setting, planning, monitoring, and evaluating specific activities.	Students use technology tools to set goals, plan activities, monitor progress, and evaluate results throughout the curriculum. X	Students engage in ongoing metacognative activities at a level that would be unattainable without the support of technology tools.

- students choose real candidate from period election – must run $ campaign & prepare speeches to get their candidate elected

Appendix I

Observation – Day 4

8th U.S. History #4

Technology Integration Matrix	Levels of Technology Integration into the Curriculum				
	Entry: The teacher uses technology to deliver curriculum content to students.	**Adoption:** The teacher directs students in the conventional use of tool-based software. If such software is available, this level is the recommended entry point.	**Adaptation:** The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.	**Infusion:** The teacher creates a learning environment that infuses the power of technology tools throughout the day and across subject areas.	**Transformation:** The teacher creates a rich learning environment in which students regularly engage in activities that would have been impossible to achieve without technology.
Characteristics of the Learning Environment					
Active: Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.	Students use technology for drill and practice and computer based training.	Students begin to utilize technology tools to create products, for example using a word processor to create a report.	Students have opportunities to select and modify technology tools to accomplish specific purposes, for example using colored cells on a spreadsheet to plan a garden.	Throughout the school day, students are empowered to select appropriate technology tools and actively apply them to the tasks at hand.	Given ongoing access to online resources, students actively select and pursue topics beyond the limitations of even the best school library.
Collaborative: Students use technology tools to collaborate with others rather than working individually at all times.	Students primarily work alone when using technology.	Students have opportunities to utilize collaborative tools, such as email, in conventional ways.	Students have opportunities to select and modify technology tools to facilitate collaborative work.	Throughout the day and across subject areas, students utilize technology tools to facilitate collaborative learning.	Technology enables students to collaborate with peers and experts irrespective of time zone or physical distances.
Constructive: Students use technology tools to build understanding rather than simply receive information.	Technology is used to deliver information to students.	Students begin to utilize constructive tools such as graphic organizers to build upon prior knowledge and construct meaning.	Students have opportunities to select and modify technology tools to assist them in the construction of understanding.	Students utilize technology to make connections and construct understanding across disciplines and throughout the day.	Students use technology to construct, share, and publish knowledge to a worldwide audience.
Authentic: Students use technology tools to solve real-world problems meaningful to them rather than working on artificial assignments.	Students use technology to complete assigned activities that are generally unrelated to real-world problems.	Students have opportunities to apply technology tools to some content-specific activities that are based on real-world problems.	Students have opportunities to select and modify technology tools to solve problems based on real-world issues.	Students select appropriate technology tools to complete authentic tasks across disciplines.	By means of technology tools, students participate in outside-of-school projects and problem-solving activities that have meaning for the students and the community.
Goal Directed: Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	Students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate.	From time to time, students have the opportunity to use technology to either plan, monitor, or evaluate an activity.	Students have opportunities to select and modify the use of technology tools to facilitate goal-setting, planning, monitoring, and evaluating specific activities.	Students use technology tools to set goals, plan activities, monitor progress, and evaluate results throughout the curriculum.	Students engage in ongoing metacognative activities at a level that would be unattainable without the support of technology tools.

Students using Declaration of Independence, Bill of Rights + Constitution to justify right of Southern States to leave union –

tech not in use but behaviors that are goal of matrix are there – students collaborating, building on knowledge, building understanding making connections + sharing knowledge

Appendix J

Observation – Day 5

8th U.S. History #5

Technology Integration Matrix	Levels of Technology Integration into the Curriculum				
	Entry: The teacher uses technology to deliver curriculum content to students.	**Adoption:** The teacher directs students in the conventional use of tool-based software. If such software is available, this level is the recommended entry point.	**Adaptation:** The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.	**Infusion:** The teacher creates a learning environment that infuses the power of technology tools throughout the day and across subject areas.	**Transformation:** The teacher creates a rich learning environment in which students regularly engage in activities that would have been impossible to achieve without technology.
Characteristics of the Learning Environment					
Active: Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.	Students use technology for drill and practice and computer based training.	Students begin to utilize technology tools to create products, for example using a word processor to create a report.	Students have opportunities to select and modify technology tools to accomplish specific purposes, for example using colored cells on a spreadsheet to plan a garden.	Throughout the school day, students are empowered to select appropriate technology tools and actively apply them to the tasks at hand.	Given ongoing access to online resources, students actively select and pursue topics beyond the limitations of even the best school library.
Collaborative: Students use technology tools to collaborate with others rather than working individually at all times.	Students primarily work alone when using technology.	Students have opportunities to utilize collaborative tools, such as email, in conventional ways.	Students have opportunities to select and modify technology tools to facilitate collaborative work.	Throughout the day and across subject areas, students utilize technology tools to facilitate collaborative learning.	Technology enables students to collaborate with peers and experts irrespective of time zone or physical distances.
Constructive: Students use technology tools to build understanding rather than simply receive information.	Technology is used to deliver information to students.	Students begin to utilize constructive tools such as graphic organizers to build upon prior knowledge and construct meaning.	Students have opportunities to select and modify technology tools to assist them in the construction of understanding.	Students utilize technology to make connections and construct understanding across disciplines and throughout the day.	Students use technology to construct, share, and publish knowledge to a worldwide audience.
Authentic: Students use technology tools to solve real-world problems meaningful to them rather than working on artificial assignments.	Students use technology to complete assigned activities that are generally unrelated to real-world problems.	Students have opportunities to apply technology tools to some content-specific activities that are based on real-world problems.	Students have opportunities to select and modify technology tools to solve problems based on real-world issues.	Students select appropriate technology tools to complete authentic tasks across disciplines.	By means of technology tools, students participate in outside-of-school projects and problem-solving activities that have meaning for the students and the community.
Goal Directed: Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	Students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate.	From time to time, students have the opportunity to use technology to either plan, monitor, or evaluate an activity.	Students have opportunities to select and modify the use of technology tools to facilitate goal-setting, planning, monitoring, and evaluating specific activities.	Students use technology tools to set goals, plan activities, monitor progress, and evaluate results throughout the curriculum.	Students engage in ongoing metacognative activities at a level that would be unattainable without the support of technology tools.

roject work – Students each have own project but are collaborating + helping each other

Students who have already showed mastery of method include that in planning – Students monitor + evaluate own work + process

Appendix K

Teacher Survey

1. **How would you describe your approach to teaching?**

When teaching history I want kids to experience history more so than be told what happens. I try to design lessons that place the students in the situations more so than just looking up and researching facts. Sometimes they are presented with problems, sometimes they reenact events in history and sometimes they judge history by having experienced it (to a small degree) and then draw conclusions from it.

2. **Has the iPad changed your approach to the way you teach your students?**

Though only in the first year, I find I am covering the same content, maybe even exposing them to more, but it is no longer coming from me, but rather how they use the iPad. I seem to do less teaching of content and more clarifying of content when issues or confusion arise. I know this because we seem to spend more time in the evaluation and analysis stage of the lesson more so than knowledge or comprehension.

3. **Has the iPad change the way you run/manage your classroom?**

Absolutely! I have chosen to go paperless which allows an entirely different approach to the way I communicate with students. This does NOT mean they are staring at their iPads and no interaction occurs between teachers and their peers. It saves time and opens communication in that I send and receive materials via email. I can grade most products via email and kids and communicate with me or each other. I may get a few emails each night from students with questions, which I prefer because I know I can help them beyond the minutes they are in my class. The teacher website also provides a resource for students to use which makes them less reliant on me because so much is explained in emails or the website itself.

4. **Describe any differences in the way you prepare instruction now that you have the iPad compared to before you had the iPad.**

Work flow became the first obstacles to overcome and email helped tremendously with that as did the website. The next obstacle was to decide in what format students would receive various materials depending on how I wanted them to interact with them (PDFs for reading and highlighting, etc.). It seems silly, but I seem to have to explain things less, because it is all spelled out in what I send students and they can review most of it prior to coming to class which in the end saves time.

5. **Describe any differences in communication pre and post iPad with your students.**

As stated earlier, communication has improved because kids can email whether in school or at home. Absences become less of an obstacle because kids are at home getting the same emails as did the kids in class. I have even had kids show up to school the next day with work completed from the day before because they knew what was asked of them while they were gone. I too had a student go all the way to Saudi Arabia and log in to take an assessment at the same time as students sitting in my class. It was really cool.

6. **Do you have different expectations of your students' performance and behaviors now that they have the iPad?**

It is a bit early for that, but I think I hold kids to a higher standard with regard to assignment completion, self direction and quality because I know the technology evens the playing field a bit. They all have access to the internet, apps and content so economic status and ability is blurred a bit in what I see from student products.

Appendix L

Combined Student Survey Answers

Question 1. How has the iPad changed how you approach your school work? How you keep track of your schoolwork, how you complete your school work, etc.?

Student 1:
To me with the iPad it is harder to keep track of home work

Student 2:
I'm a lot more organized because there is an app. where I can write down the class name and under that I can write what homework we have for that class. It's a lot harder to forget something because it's all right there. It's harder to have any legitimate excuse as to why you don't have homework done.

Student 3:
The way I approach school work has changed because I can do more work on the go. The iPad is very portable so I can do things in the car or anywhere else that I normally would not be able to. There is also a calendar app installed on the iPad that helps me keep track of my assignments.

Student 4:
I think I approach my school work in a lot of different ways because the iPad gives you so many options. I keep track of my school work by using the blogs and websites teachers post. For me, its a lot easier to complete homework because its such an easy, on the go tool.

Student 5:
I make sure I have a folder for every class in pages, keynote, and neu.annotate

Student 6:
It's much quicker to do the work and we can keep track of work on the iPad and we can just take one thing home to do all of the subjects

Student 7:
Im able to keep track of what assignments I have and When they are due better so I'm able to remind myself about them.

Student 8:

The iPad has changed my way because I don't have to usually bring anything home. Like I used to bring a math book, but now I have it on my iPad. I keep track of my work by checking my documents and seeing if they are done.

Question 2. How has the iPad changed how you communicate with your teachers? With the other students in class?

Student 1:
You can just email your teachers and other students so it's a lot easier

Student 2:
I can communicate with teachers a lot more effectively. I can turn things in even when I'm on spring break, for example. It's easier to get caught up if you miss a few days. Technically we have a longer time to get projects done if we can turn it in before the night is over. I have turned in a couple projects at 10 o'clock, and it's not late. It's nice to have the extra time. It's easier to do group work, too. Sometimes we would have questions for our peers about what we should do to help get the work done, and emailing them was a lot easier than looking up their house phone number and trying to get a hold of them.

Student 3:
The iPad makes it much easier to communicate with teachers because of our email accounts. Instead of having to wait until the next day to ask a question, we can simply send an email. This also applies to classmates.

Student 4:
The iPad has made it so simple and easy to communicate with teachers! Its amazing how efficiently the email works out! With the other students, its a lot easier to talk to them about simple homework projects.

Student 5:
If I'm going to be sick I can email my teacher and ask what I'm going to need to make up. When I'm sick I can email my classmates if I need anything extra or if they can email me notes

Student 6:
It's much easier to communicate with teacher with questions because we can email the from anywhere

Student 7:
I can communicate with my teachers better through email to ask them questions that can't wait till the next day, and i don't have to have my classmates number to be able to talk to them about a project.

Student 8:
The iPad brought email to the picture which is new because I used to have to turning my homework, but in most classes you usually turn it in via email. Still with the teachers I can email a question ad not wait until the next day. With students I personally stay away from the idea of emailing friends because it is monitor so I stay face to face with them.

Question 3. How has the iPad changed the way your teachers run their classrooms? Deliver instruction? Assign or collect assignments?

Student 1:
They can just email us the worksheets we are suppose to do

Student 2:
The teacher doesn't use paper. I think once the teachers get a full handle on the iPad, all classrooms will eventually be paperless. Instead of telling us what to do, they can send us an email explaining what to do right when we get to class, which in the end can be more productive if all the kids no what to do right when they walk in the door, they can sit down and get to work. I'd say about half of the assignments are collected through email or posted on a class website. They can collect assignments by emailing us instructions or posting the instructions online.

Student 3:
The teachers are a lot more technology based, but I like that. We are able to do our own researching instead of the teachers giving us all of the information. The teachers assign and collect homework electronically by having us email our worksheets and assignments to them.

Student 4:
I think all the classroom settings have changed dramatically. Everything we do is pretty much on our iPads. They deliver almost all instruction by either posting in on the blog, or emailing it to us. The both assign and collect through email, unless its on paper (which is very rare.)

Student 5:
The teacher can just email us our assignment and then we can email it to them and it takes less time for them to get it

Student 6:
It's more self directed and we can email the assignment to them

Student 7:

Emailing with our iPads has become a new major thing, they send out assignments through it and they collect the assignments through it almost every day.

Student 8:
Math hasn't change very much only with calculators. U.S History is mainly on the iPad while other classes use it as another tool for the classroom. In deliver instructions they usually make it part of the assignment. In U.S History, the teacher uses the iPad for everything and makes you email him his assignments and he emails them to you before class so you can look at the assignments.

Question 4. How do you think the iPad has changed the types of assignments that your teachers assign you?

Student 1:
They seem to be the same except they are on the iPad

Student 2:
They can assign more projects with a smaller time frame because we have more time to work on them since we have our iPads at home. Teachers can expect more from us, as students, because we have the tools to do some pretty cool things

Student 3:
I'm not sure that the actual assignments have changed, but the way of completing them have. For instance, instead of reading a textbook and filling out a worksheet manually, we can research our answeres and type them into the provided document from our teachers.

Student 4:
No Answer

Student 5:
We can now take pictures of our work (like in science) instead of sketching

Student 6:
It's more researched based because we have the Internet with us

Student 7:
They assign us more things on our iPad than actual paper assignments because it's just easier not to print anything and also easier to keep track of the assignments.

Student 8:

The iPad I think in a way made it easier to pass out assignments. Another way is the format is easier to grade and give comments about the assignments.